Lessons Learned from Successful Earth Science Research-to-Applications Efforts

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* two examples

* lessons learned

* conclusions

SERVIR

- ✤ SERVIR—the Regional Visualization and Monitoring System—helps government officials, managers, scientists, researchers, students, and the general public make decisions by providing Earth observations and predictive models based on data from orbiting satellites.

- ✤ The SERVIR system helps nations in Mesoamerica, East Africa, and the Himalayan regions cope with eight areas of societal benefit identified by the Group on Earth Observations (GEO): disasters, ecosystems, biodiversity, weather, water, climate, health, and agriculture.

- ✤ Dan Irwin - Head of SERVIR

SERVIR

✦ Decision makers use SERVIR to improve their ability to monitor air quality, extreme weather, biodiversity, and changes in land cover, and the system has been used over 35 times to respond to environmental threats such as wildfires, floods, landslides, and harmful algal blooms. In addition, SERVIR analyzes, provides information about, and offers adaptation strategies for nations affected by climate change. In a very real sense, SERVIR provides basic information for living on planet Earth.

✦ Works hand-in-hand with the State Department USAID program

✦ http://www.nasa.gov/mission_pages/servir/index.html
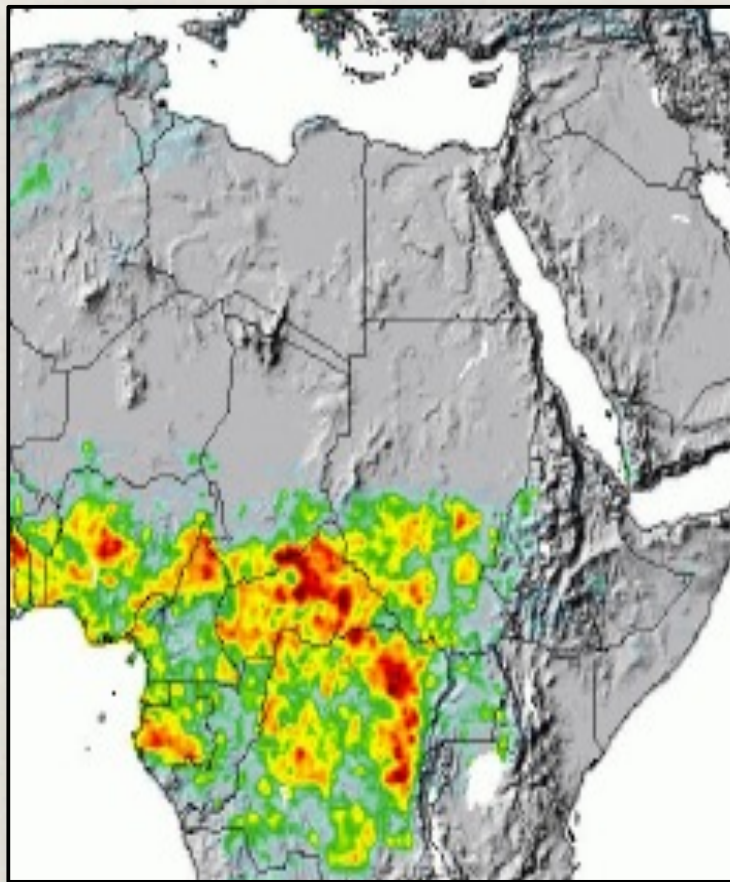
Flood Forecasting in Africa

Mapping Fires in Guatemala Mexico
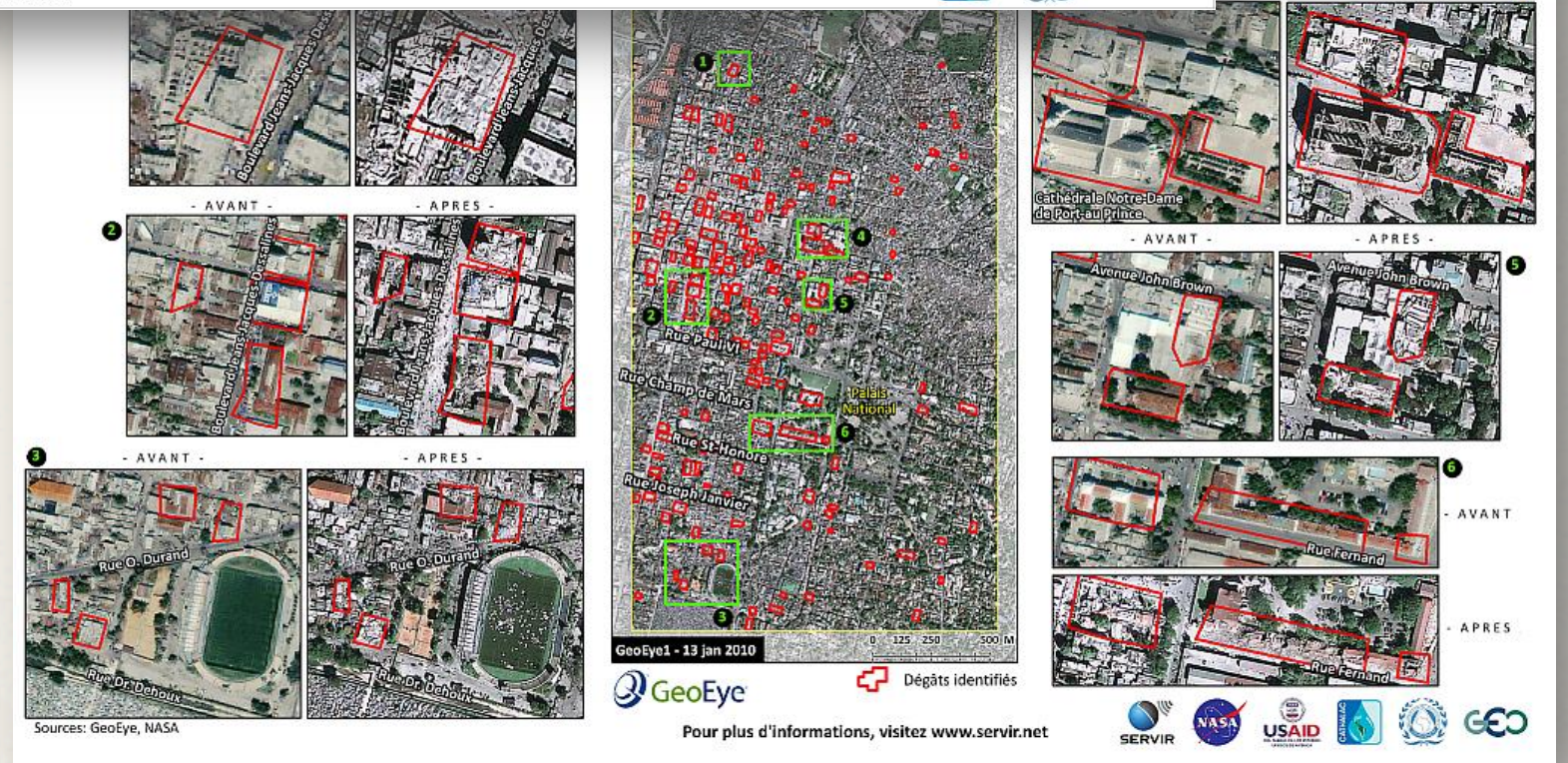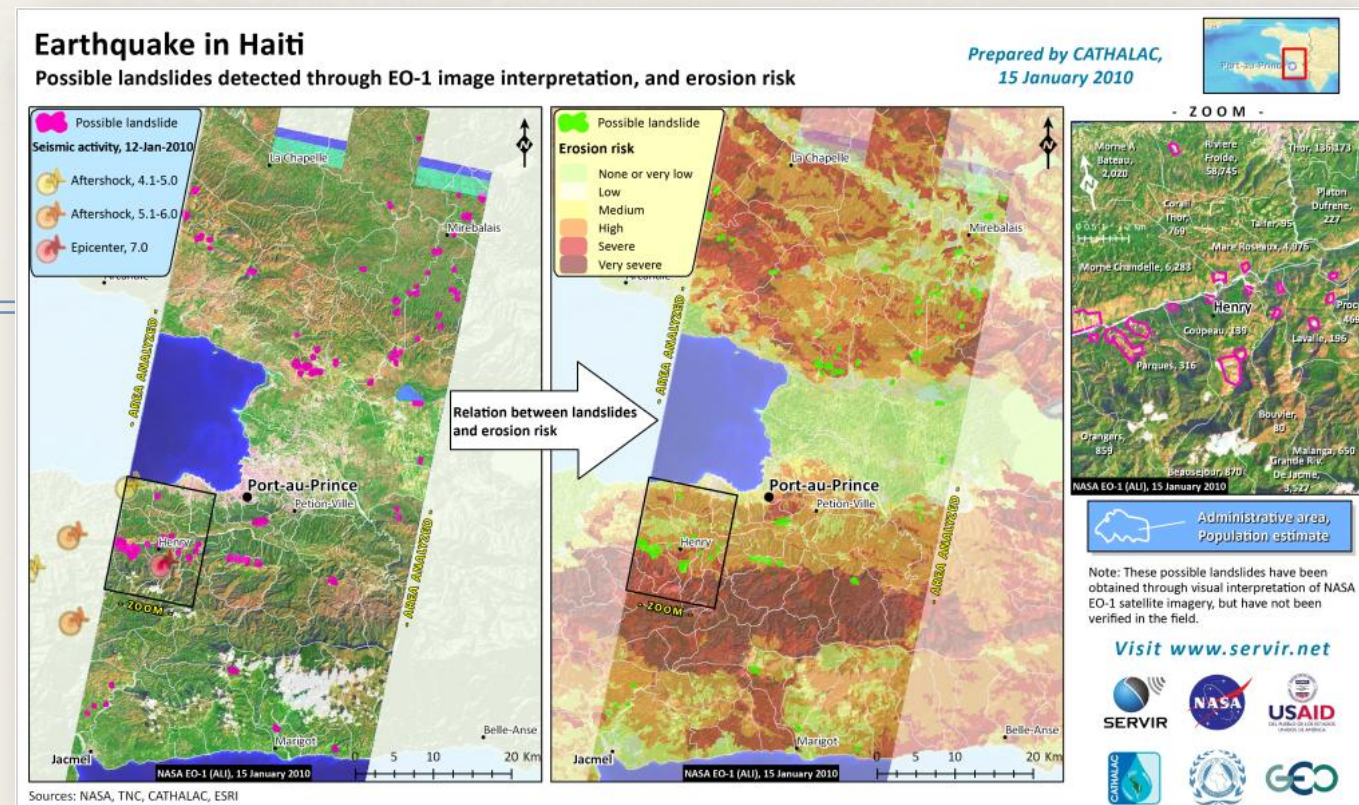

Earthquake in Haiti

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SPoRT

- Short-term Prediction Research and Transition (SPoRT) Center is a NASA project to transition unique observations and research capabilities to the operational weather community to improve short-term forecasts on a regional scale.

- Works hand-in-hand with NOAA National Weather Service

- http://weather.msfc.nasa.gov/sport/

- Dr. Gary Jedlovec - Head of SPoRT

MODIS Difference: Tornado Tracks
17 April - 4 May 2011

Birmingham

Tuscaloosa
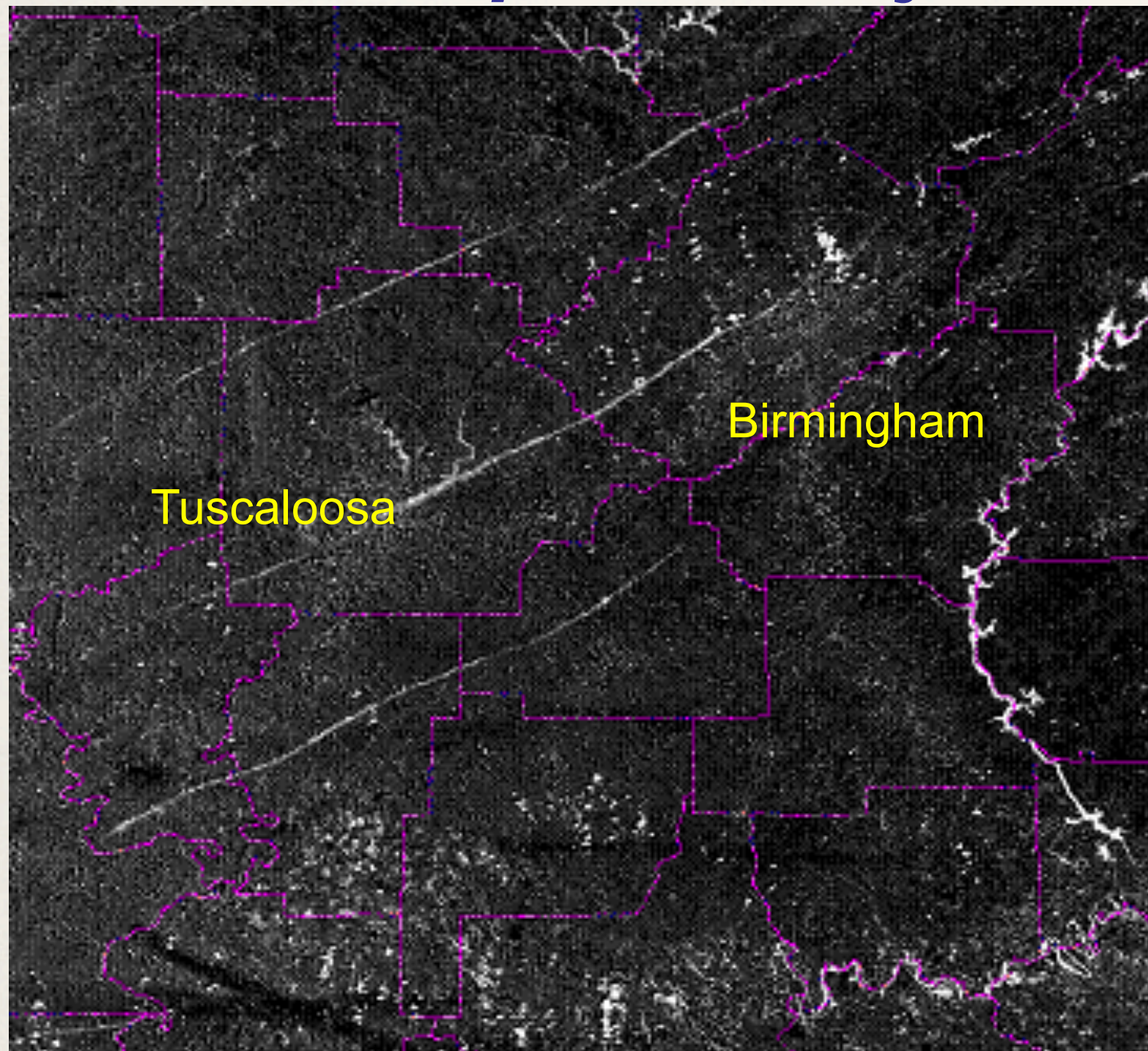
The MSFC SPoRT project applied advanced processing techniques to "before" and "after" images to enhance visibility of tornado damage tracks.

250m visible channel data from MODIS passes on April 17 (Aqua) and May 4 (Terra) were differenced and processed to produce image on left (corresponding to coverage of RGB image in previous slide).

This imagery is currently being used by the NWS in Google Earth to assist in in damage assessment.

All damage tracks from EF3 and stronger tornados for the southeastern US outbreak are identifiable in the MODIS difference images.

SPoRT

Lessons Learned

* Nothing happens overnight

* There has to be a commitment on both sides:
    * research/operations
    * science/applications
    * provider/user

* Commitment must exist at all levels; from management down to implementer and user

* End-User engagement from the beginning is important

Lessons Learned

* The provider and user exist in very different cultures

    * Provider (researcher)

        * focuses on detail, perfection

        * how things work

        * scientific method

    * User

        * just want it to work

        * doesn't care about some of the details

* The researcher must live in the user world long enough to understand it - not the other way around

Lessons Learned

* Clearly identify the needs and requirements

* Reassess needs and requirements on a frequent and regular basis

* Identify conditions of satisfaction for the end user

* Involve the user in the entire process

* The user must have some investment in the product in order for them to eventually own it

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Lessons Learned

* Need to have this conversation with the end user early in process:

  * How to get data - not the provider choice, must be accessible

  * When do they need it - frequency of update, prediction parameters

  * What format do they use - not the provider choice

  * How is the data used by end user - not how the provider uses it

Lessons Learned

* Just because we (i.e. researchers) have provided a great product, the user will adjust to it - NOT

* User frequently does not have the resources to receive and ingest the product

* In the cases of SERVIR and SPoRT, USAID and NWS provide capacity to the receiver to ingest the product

* Develop a strong advocate in the user world - they will help convince the users to buy into the product
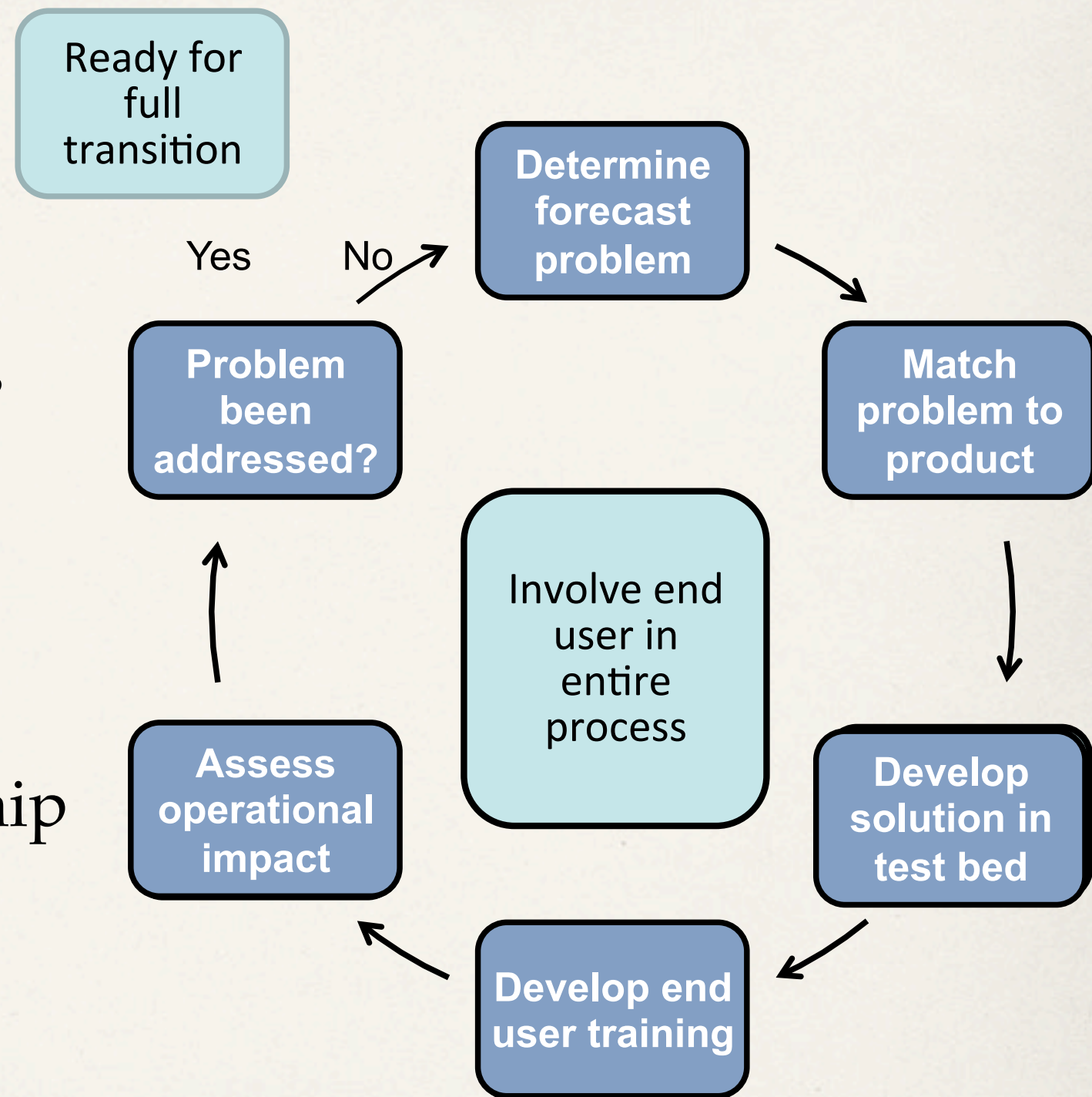
Lessons Learned

* Must develop trusted relationships because the user will not appreciate all that you have to offer

* Recognize and understand the difference between research, building tools, and transition process

* Include training and building capacity in the transition process

SPoRT paradigm

* match forecast challenge to data/product
* develop solution / demonstrate in "test bed" environment
* integrate successful products into end user's decision support tools
* create product training
* perform product assessment
* Maintain interactive partnership with end user throughout process
* Need local end user advocate for product
* Endorsement from all levels of end user organization

Ready for full transition

Yes   No

Determine forecast problem

Match problem to product

Problem been addressed?

Involve end user in entire process

Develop solution in test bed

Assess operational impact

Develop end user training

Lessons Learned

* Marketing - getting the word out

    * Need some early success stories

    * Demonstrate how the user benefits - economic impact is the key

    * Invest in resources to properly tell the story, demonstrate the value

    * Team up with experts - don't try to do this yourself

Conclusion

* We have a lot to learn from our Earth Science colleagues

* They have been at this much longer than we have

* But we have a future

* This is an area of growth in the discipline because it brings a new dimension, an applied dimension

* Transitioning must be intentional and be able to stand on its own